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Principal Investigators: John Carlon, Sacramento River Programs Manager
The Nature Conservancy
Project Role: Project Director

Fred Thomas, Pest Control Advisor
CERUS Consulting
Project Role: Project Coordinator

Project Title: Biological Prune Systems (BPS) for the Upper Sacramento Valley

Summary:

"A cooperative program for Prune Growers to refine and adopt farming practices that remain economically viable while striving to protect environmental quality."

With the Innovations in Pest Management grant The Nature Conservancy implemented a biologically based pilot system within the prune production region of the Sacramento, Feather, and Yuba River watersheds. In the first year of the project we recruited a Project Coordinator, formed an Advisory Team, recruited a core group of progressive prune farmers and their Pest Control Advisors (PCA), conducted Advisory Team visits to each site, developed site specific plans at each farm to reduce pesticides and synthetic nitrogen, recruited researchers and University of California Cooperative Extension Specialists, received support from, The California Prune Board, Prune Marketing Cooperatives, agribusiness supply companies, and promoted the project through, local newspapers, agricultural periodicals and a 'BPS Prunegram' Newsletter.

The Biological Prune Systems is unique in its approach to create farming systems near sensitive riparian corridors and waterways that create private stewardship of buffered areas to enhance biodiversity, wildlife, and protect environmental quality as a primary objective. The BPS project evaluated the success and difficulties of many other projects to create a plan that includes partnerships that lead to the sustainability of a public/private/industry stewardship program. The Nature Conservancy is committed to preserving and improving the ecologically rich riparian river systems and is a catalyst to the creation of the BPS methods with their farm neighbors.

The initial group of prune farmers and their PCAs will test the farming suggestions and monitoring protocols to develop a locally based stewardship program to protect environmental quality. Depending upon the sites the farmers have agreed to plant cover crops to provide nitrogen or improve water infiltration; plant border filter strips to reduce dust and prevent off site movement of pesticides, nutrients, and soil; plant diverse shrubs and trees to attract beneficial insects and birds; apply compost; rely on soft chemicals, *Bacillus thuringiensis* sprays and foliar oil sprays for control of pests; and release beneficial predators and parasitoides. The first group of farmers currently farm more than 5,000 acres of orchards with over half being prunes.

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Results and Discussion:

There were nine specific objectives of the BPS Project that The Nature Conservancy undertook to achieve with the Department of Pesticide Regulation Pest Management Grant in 1996 - 1997. The accomplishment of each of these objectives during the grant year with a discussion of how well we achieved the objectives are:

1. Organize an Advisory Team. The BPS Advisory Team is a dynamic group that has changed and evolved during the first year of the project. The original intent of the Coordinator was to ensure the solid support of the UCCE Farm Advisors, but this changed with Rick Buchner and Bill Krueger resigning from the team in December because of time restraints. Bill Olson, who does triple duty as the Butte County Farm Advisor, County Administrator, and Yuba-Sutter Prune Farm Advisor, is helpful when time permits.

The current BPS Advisory Team is:

Project Director:	John Carlon, The Nature Conservancy
Project Coordinator:	Fred Thomas, CERUS Consulting
Cooperative Extension:	Bill Olson, Butte County
Local Farmers:	David Evers, Farmland Management Services
	Dick Jacobs, CSU, Chico Farm Operations
Pest Control Advisor:	Cliff Kitayama, Scientific Methods, Inc.
TNC Liaison:	Dawit Zeleke, The Nature Conservancy
Research Liaison	Lee Altier, Ph.D., CSU, Chico Agriculture Department

Because the Advisory Team manages the direction of the program, the Team has suggested the following additions be considered and pursued; a NRCS Representative, an Agrichemical Industry Representative, and a Prune Processing Industry Representative. Each of these additions to the Team would be helpful and collaborative.

2. Recruit 10 Prune Growers. We recruited the following farmer cooperators during the first year of the project. We may recruit an additional 5 or more growers if the Advisory Team agrees that it can continue to give the same level of service to all enrolled participants.

County	Farm	Location	Acres in Program
Tehama	Shasta View	Gerber	25
Tehama	Farmland Management	Corning	20
Glenn	Billiou Farms	Hamilton City	20
Glenn	CSU, Chico	Hamilton City	10
Glenn	Sol Norte	Butte City	20
Butte	Philip Stanfield	Biggs	20
Butte	Onstott Orchards	Gridley	15
Yuba	Kalkat Bros.	Marysville	15
Yuba	Curt Sanders	Marysville	12
Sutter	John Heier	Live Oak	10

3. Facilitate regular meetings with the growers, their PCAs, and the Advisory Team.
During the first year we had seven meetings that were attended by the program participants. Four of the seven meetings were specifically for the facilitated interaction of the growers, their PCA's and the Advisory Team. Attendance at these meetings was moderate with about 50 % of the farmer cooperators being represented at any one meeting.

The issue of grower participation has been discussed at the Advisory Team meetings. The following two reasons has been suggested to account for the less than complete attendance by the growers and their PCAs at every meeting. The sizes of the operations are commercial with six of the participants farming 600 to 1000 plus acres. These larger growers have difficulty leaving the supervision of the ranch from the March spraying season through the harvests that end in October. The farm cooperators harvest peaches beginning in early July, then prunes, then almonds, then walnuts through October.

The second reason that is unique to the BPS Program compared to other BIOS, BIFS, etc., programs is that our project takes in 5 counties, not just one county. With almost 100 miles between the farthest sites, no matter where we have our meetings, there are always half the grower participants or their PCAs who must travel for an hour to attend.

These two issues of large ranches that are scattered across 5 counties are viewed as the strength of the program. The BPS Program is more regional in scope and easily addresses the issues of the watershed. Additionally by involving successful commercial participants the program has earned the respect of the prune and agrichemical industry as a guide too proactive, ecologically based prune production. The Advisory Team realistically expects all of the program participants to attend at least half of the meetings, demonstrations, and field days. In return the participants should expect the program to offer new and interesting information on pesticide reduction, IPM, stewardship, and wildlife friendly farming at each meeting.

4. Reduce synthetic nitrogen fertilizer and organophosphate use by 30 % over three years. Reducing the use of synthetic nitrogen fertilizer by 30 % over three years is an objective that was revisited after enrolling the initial ten growers. During the enrollment interview and the farm visits, the recurring request was for improved water infiltration. Several growers also requested plans that included planting nitrogen producing legume cover crops, but usually as a secondary benefit to improving water infiltration.

This information and direction from grower participants have modified the fertilizer objectives of the program. A 30 % reduction in the use of synthetic fertilizer can still be achieved on the overall project through the use of legumes and compost applications. However more important to much of the prune industry is the issue of irrigation efficiency, water infiltration, winter access, compaction due to disking, non tillage sods versus disking, potassium uptake by prunes, exchangeable potassium in the soil, root distribution of prunes as it affects nitrogen, potassium and irrigation uptake, and the role cover crops can play in addressing these 'grower' requests.

Clearly making a healthy tree by ensuring optimum water infiltration is an important part of any pesticide reduction program. By improving overall nutrient and water availability, nitrogen can be used more efficiently for the output of the prune crop. Currently the nitrogen fertilizer objective of the BPS project is to ensure that synthetic nitrogen is being used efficiently, is not leaching, and is not traveling off site. Among the ways of achieving this is through legumes, soil improving cover crops, perennial sods, non tillage, filter strips and nitrate trap crops, and compost applications to improve soil health, active organic matter, permeability, and nutrient cycling.

The second part of this objective, the reduction of organophosphate (OP) pesticide by 30 % on the project acres is in progress, and will be evaluated after the Spring and Summer pest season has occurred. The other objective regarding winter applications, is discussed below.

5. Eliminate winter applications of Diazinon/Supracide on participating farms. Of the 10 project sites, 5 applied winter applications of OP in 1996, 1 applied a synthetic pyrethroid, and 4 did not apply any pesticides. In 1997, on the project sites, 2 applied OP, and 8 did not apply anything except perhaps dormant oil.

In 1996, 107 acres out of the 167 enrolled BPS acres received a winter pesticide (Diazinon, Supracide, or Asana). Of the 167 acres enrolled in 1997 there were 27 acres that received a dormant pesticide.

Even though we were not able to eliminate dormant applications of pesticides the first year, the BPS project was able to reduce the use of dormant pesticides by 75% on the participating acres.

6. Provide each farmer a site specific plan that outlines best management practices. The Advisory Team visited each BPS site in the Fall just after prune harvest. The Team visited with the grower, their PCA, and often the ranch foreman at the orchard. As a group, we verbally discussed how to implement the program, what the history of the orchard was, what the past pest management was in 1996, and the physical limitations of the site such as the soil and irrigation system.

From the verbal discussion, many apparent obstacles were solved by either the farmers on the team, the PCA, and often by the farmers themselves. We generally reached a consensus of what the best management practices would be for the site that the project grower felt comfortable he could achieve without suffering an economic loss. The suggestions and results of this site visit meeting were then incorporated into a Farm Plan that was sent to the grower and their PCA.

7. Coordinate a pest monitoring program for each parcel in consultation with the farmer and their PCA. Through the farm visit and the development of the Farm Plan, the farmers and their PCAs became active participants in the management of the BPS site. Within the project 8 of the 10 growers have a regular PCA and of these seven were able to attend the site visit and help to develop the management plan for the site. The PCAs incorporate the concerns about a cover crop, aphids, and Peach Twig Borer on the BPS block during their regular monitoring on the grower's ranch.

In addition to the monitoring done by the PCAs, the BPS project also plans to monitor a soil biota baseline, nematode sampling, standard soil and leaf analysis, irrigation water analysis, rodent populations, photo monitoring sites, beneficial insects, baseline earthworm populations, vegetative biomass on the orchard floor, observations of resident and migratory birds, and an economic analysis. This portion of the project will occur in early summer of 1997 when additional grant funds become available.

8. Hold on-farm field days, workshops, and demonstrations. There were four meetings held during the year that were advertised and open to the public. The information was specifically addressed to project growers and was attended by many other prune or orchard growers who were interested in cover crop planting and management or pesticide reduction strategies. The main Workshop held at the Colusa Farm and Equipment Show featured excellent presenters on the issue of dormant applications of pesticides and offered prune growers stewardship options. An experienced panel of

local prune growers described how they avoid the need for dormant sprays of pesticides. The prune farmers attending the meeting comprised over 6 percent of the California prune acreage.

The field days and workshops were:

Oct. 2	Cover Crop Demonstration	Butte City
Jan. 10	Grower/PCA Meeting	Chico
Feb. 6	BPS IPM Innovator Workshop	Chico or Colusa
April 18	Cover Crop Field Meeting	Gridley/Chico

9. Disseminate monitoring results and field conditions to participating growers through a newsletter. Three editions of the newsletter, BPS Prunegram, were published the first year. There are approximately 200 copies sent with the break down being; prune growers 100, other orchard growers 20, prune processors 20, pest control advisors and companies 35, researchers and cooperative extension 25.

Other Outreach and Collaborative Efforts

A. California Prune Board.
We contacted the California Prune Board in the Spring when the project began and had a December meeting with Rich Peterson, Executive Director, and Gary Obenauf, Research Director. Through their suggestions we submitted a grant proposal to the Research Committee of the Prune Board for promotion of the program. Because funds for research are always limited and our program is more outreach and adoption, the grant was not approved. However because of the strong support for the BPS program by many Prune Board members, Rich Peterson offered to provide us with sponsorship and cost sharing of our meetings, newsletter reproduction, mailings, their promotional products, and other support from general promotion.

This support included the opportunity to promote our BPS IPM Workshop to the growers at the Prune Board Luncheon in Colusa the day prior to the workshop at the Colusa Farm Show. The positive support for the BPS project by the California Prune Board is both an opportunity and a responsibility to ensure that we serve the needs of the Prune Industry.

B. Natural Resources Conservation Service
The BPS Program invited a member of the Natural Resources Conservation Service to attend and officially belong to the Advisory Team. The Glenn and Tehama offices are currently short staffed and heavily involved in recent flooding, and they have been unable to fully commit to the project. However Wendell Gilgert has a strong interest in helping with cost sharing for Integrated Crop Management and combining our resources on filter and buffer strips for watershed protection.

Additionally, Alan Forkey and Roney Gutierrez from the Colusa County NRCS and the Sand and Salt Creek Watershed Project both sponsored and attended our BPS IPM Workshop, welcome the BPS Project as a member of their Ad Hoc Committee, and plan to promote our meetings in their newsletter.

C. CSU, Chico Cover Crop and Compost Research Application to FREP
Dr. Lisa Stallings and Dr. Pat Delwiche, CSU, Chico Agriculture professors are applying for a grant from the Fertilizer Research and Education Program for a three year project. If the grant is approved they will use several BPS sites as in field comparisons to their replicated site. The project will measure potassium uptake, water infiltration, and root density in prune orchards with severe

potassium deficiency when treated with compost, cover crops, compost with cover crops and control. The long term results of this research could have considerable impact on prune orchard health using cover crops or compost.

D. Sunsweet Prune Owl Box Program.
Half of the BPS growers are members of the Sunsweet Prune Cooperative and contact has been made to mutually support the IPM concept of the BPS Project. Sunsweet has started a proactive program of offering grower members and the general public barn owl boxes made from recycled prune bins that would have otherwise gone to landfills. The boxes are made by the Merced High School ROP program and have been so successful that there is a three month backlog on orders. An offer has also been made to provide our half hour presentation on the BPS project at the Sunsweet Grower meetings held throughout the state.

E. Tri Counties Prune Day, Visalia.
The BPS Coordinator was invited by Steve Sibbett, Pomology Farm Advisor for Tulare County, to present information on the BPS project to the San Joaquin Prune growers at their Tri Counties Prune Day. A recently completed slide program on the project was valuable in explaining the program to the 50 plus participants and how they could become involved with their own local program. From the audience 11 requested to be added to the newsletter mailing list.

F. PEW/Collaborative Research Biological Systems Network
At the end of January we attended a national meeting of PEW funded Biological Farming System Projects to share successful methods and techniques and discuss mutual problems and obstacles to the adoption of BIOS style projects that have sprung up in the past few years. Both Fred Thomas and Dawit Zeleke attended this two day program to represent BPS. The Network continues with an e-mail list server set up at Kearney Agricultural Center.

The other members of the group are: Sunmaid Raisin IPM Project; U of C. West Side BIFS Project; Lodi-Woodbridge Winegrape Commission IPM Program; Community Alliance for Family Farmers, BIOS Projects; Rural Agricultural Farming Institute (North Carolina), Peanut Project; and the Rodale Institute, Dairy Network Partnership.

G. Stony Creek Watershed Stewardship Group
As part of the Department of Pesticide Regulations Dormant Spray Stewardship program, Glenn County Agricultural Commissioner, Ed Romano formed a local watershed group. The group is applying for a grant to start the adoption of a dormant spray stewardship program and other non point source problems relating to the Stony Creek watershed.

The initial meeting in January was attended by close to 100 farmers and stakeholders to discuss the issues, solutions, and direction of Glenn County. The BPS Project is the only existing program in place in Glenn County with demonstration sites. At the initial meeting we were invited to present information on the project, progress to date, cover crops, and filter strips to those in attendance. We are now a member of the Steering Committee to help with direction of the group, grant applications, and offer insights on reduced chemical methods that have been successful in our project.

H. Fetzer Vineyards.
Several potential supporters of the BPS project were solicited for financial help with various parts of the project or to be a base for cost sharing with the farmer members. While some are still considering our offer, Paul Dolan, Fetzer Vineyards, gladly contributed $ 1,000 to the program. Fetzer Vineyards has many years of experience in transitional and organic vineyard production and

using compost, cover crops, and amendments to build a healthy soil with a systems approach to premium wine grape production.

It was Paul Dolan's desire to help contribute to the success of the BPS project so that prune growers in the Sacramento Valley could also appreciate the success of the farming systems that Fetzer Vineyards and Fetzer Growers have adopted in the North Coast.

I. Point Reyes Bird Observatory. (PRBO).
As part of our specialized monitoring two BPS orchards will be contracted for point count diversity and population surveys by PRBO this Spring to compare the BPS site to an adjacent conventional site treated with organophasphates.

Conclusion

The Nature Conservancy has been very pleased with the support from Department of Pesticide Regulation in the development of the BPS project. The contract manager, Robert Elliott was especially helpful from the beginning, attending our advisory team meetings, field days, and coordinating the BPS IPM Workshop. This combined effort of a private, public, business, research, and community partnership has leveraged the limited resources into the beginning of a successful IPM Innovator Program.

Attachments:

First Year Monitoring Protocols
Management Options for BPS Prune Orchards
Onstott Orchards Farm Plan
BPS Prunegrams
Press Release
Ag Alert Article
Gridley Herald Article
California Prune Board Article
Colusa Farm Show Article
Meeting Agendas
Cover Crop Demo Map
Map of Sites

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First Year Monitoring Protocols

July

1. Collect comprehensive soil and leaf tissue samples to establish a baseline.
2. Collect and test irrigation water sample for quality and nitrate.
3. Monitor Arthropod Pests: Scale, Mites, Peach Twig Borer, Aphids.

August

1. Collect yield, dryaway, and sugar data.

September

1. Collect soil biota/quality information.
2. Determine existing small mammal (rodents) populations.
3. Establish fall photo monitoring sites in the BPS orchards.

January/February

1. Winter Monitoring of Arthropod Pests: Scale, Mite eggs, Peach Twig Borer, and Aphids.
2. Record orchard floor complex of both planted and resident winter vegetation.
3. Collect winter photo monitoring.

March/April

1. Monitor Disease: Brown Rod, Blast, Phytophthora, and Scab.
2. Monitor Arthropod Pests: Scale, Mites, Peach Twig Borer, Aphids.
3. Monitor Arthropod Beneficials: Lacewings, Spiders, Predatory Mites, Gray Field Ants, Aphytis, and Parasites.
4. Collect baseline earthworm populations.
5. Record orchard floor vegetative biomass.
6. Collect spring photo monitoring.

May/June

1. Monitor Diseases: Scab, Rust, Incipient Brown Rot.
2. Monitor Arthropod Pests and Beneficials.
3. Record orchard floor complex of summer vegetation.
4. Observe and record resident and migratory bird species.
5. Collect and analyze economic data of first BPS year.
6. Collect summer photo monitoring.

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Management Options for BPS Prune Orchards

July

- Collect soil and leaf tissue samples.
- Collect and test irrigation water sample.
- Irrigate and prepare for harvest.
- Remove suckers from trunks.

August

- Harvest prunes.

September

- Management Team visit to develop custom farm plan.
- Post harvest irrigation.
- Apply compost and soil ammendments.
- Prepare cover crop seed bed.

October

- Plant cover crop seed.
- Irrigate cover crop.
- Option: Plant border filter strips.
- Option: Plant perennial insectary plants.

November

- Apply post emergent herbicide to tree rows for winter weeds.

December

- Winter monitoring of pests.

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BPS Farm Plan

Participant: Onstott Orchards

Crop: Prunes, French. Acreage in BPS, 15 acres.

Farm Visit: September 17, 1996. Greg Corriea, Mike McCaw, Cliff Kitayama, Dick Jacobs, Fred Thomas.

Observations and Suggestions:

1. Irrigation: The irrigation is a border check flood system from district water out of the Feather River. The water is too pure which adds to the infiltration problems, but is not the main cause. The application of gypsum on the surface in the Spring prior to beginning the irrigation cycle would help the infiltration slightly.

2. Soil and Soil Building: The soil on this site has a water infiltration problem and was the location of a previous University of California trial to improve the infiltration. The soil has a surface of clay loam with a hard pan/plow pan at about 9 inches. Below the hardpan is a more permeable soil with layers of silt loam. The top soil is fertile but compaction and layering are the main contributors to the infiltration of water.

Broadcasting compost would be beneficial to the soil biota but would not solve the infiltration problem or be economic as there is already considerable organic matter and pruning material in the soil. The addition of gypsum would help to improve soil structure and water infiltration. The application of 2 ton of gypsum to be disced in with the cover crop in May is recommended.

3. Fertilization: The fertilizer program has been 125 units of Ammonium Sulphate in a split application in the Spring and early Summer. Potassium is applied as Muriate at a light rate of 400 lb for five years. This regular maintenance program helped prevent dieback this year. The fertilizer program on the BPS block should be maintained for the first year until the leaf analysis of the past three years is reviewed. The cover crop will not add appreciable nitrogen but will be used for water infiltration. Some participants in the program may try mixing and banding their Potassium

with several tons of compost for better exchange. If that method of Potassium fertilization is tried on this block, then it will be possible to reduce synthetic nitrogen. The management team will help to recommend a fertilizer application based on leaf analysis, the growth of the cover crop and the crop load.

4. Orchard Floor: The floor had a complex of summer weeds and was somewhat compacted. Since the Management Team visit, the orchard was disced to set up a seed bed.

5. Cover Crop: It is recommended that a soil building mix like LM Brand 'Max Organic Builder' be planted to improve water infiltration. Greg has used this mix with good success for a number of years to improve the soil on newly planted blocks. The planting rate is 100 lb/planted acre, 12 feet wide. It can be drilled or broadcast, light harrowed, and ring rolled. The addition of Rhizobium inoculant for vetch and peas is important on this site that has not been planted for many years.

The purpose of planting a soil building mix this year is to improve water infiltration, clean up and control weeds, and aerate the soil. After harvest next year, the floor will be reestablished as a planted perennial sod which will last for 10 years. This year is for weed control and making a good flat floor for the future.

6. Floor Management: After planting, the floor will be soft. If pruning is done and stacked in every other row in February, these rows can be shredded down for frost control. The alternate rows can be mowed also, but the Spring mowing will hurt or kill the bell beans and peas if it is closer than 12 inches. The oats and vetch will recover and grow on into May. The Management Team will help with Spring time mowing and spraying decisions.

7. Pests; Arthropods: Greg agreed to remove Diazinon from the spray program on this block. PTB will be controlled with *Bacillus thuringiensis* either at the bloom spray or in May. Scale is normally controlled by predators and *Aphytis spp.* A light dormant oil at bloom and post bloom will be used to control Mealy Plum and Leaf Curl aphids. Mites should be controlled by predators.

8. Pests; Bacteria/Fungus: Continue with the previous fungicide program. If Captan is to be used for scab it will conflict with the oil spray. Based upon spring monitoring a decision will be made between Captan or oil.

9. Pests; Weeds: Continue with the previous berm control program. The cover crop should be effective in suppressing some of the summer weeds in

the tree middles. The goal this Summer is to eliminate perennial problem grasses such as Johnsongrass and Bermudagrass.

10. Beneficial Habitat and Releases: There should be early release of Chinese Lady Beetle, *Hippodamia harmonia*, to control the possibility of aphid outbreaks. Monitoring will determine if inoculative release of predatory mites is necessary. The planting of beneficial insectary shrubs on the north side of the orchard would help to decide which shrubs are well adapted to the Gridley area. A planting of 10 shrubs, two each of *Achillea millefolium, Asclepias fascicularis, Ceanothus g.* var. Yankee Point, *Eriogonum giganteum, Sambucus mexicana* alternated along the canal would allow the project PCAs to view the amount of visitation by beneficial insects in the summer. If this suggestion is interesting, we will follow up with exact plans and planting.

11. Projected Goals: Improve irrigation water infiltration by planting a soil building cover crop this year and a permanent sod next year. Having a no till sod will reduce mowing and discing in the future by having a shorter growing floor and fewer weeds. Apply gypsum for soil improvement. Remove Diazinon and other disruptive pesticides from the system and rely on predators. Monitor potential problems with aphids and treat with light oil. Consider banding compost with Potassium next year. Consider planting beneficial shrubs for experimentation.

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BPS Prunegram

September 1996 Vol. 1 no. 1

Profile

The Biological Prune Systems program (BPS), an out reach component of the Phelan Island Sustainable Farming Initiative, is a cooperative program for Prune Growers to refine and adopt farming practices that remain economically viable while striving to protect environmental quality.

Prune Growers in the program will try different management methods with support from an advisory team. The project's objectives are to reduce synthetic nitrogen fertilizer by 30 % and eliminate organophosphate pesticide use over three years on participating farms. The orchards vary in size, soil types, age and irrigation, but each site will incorporate biologically beneficial practices to achieve the objectives.

The project is a partnership between The Nature Conservancy, the U. S Fish and Wildlife Service (USFWS), California State University, Chico (CSUC), University of California Cooperative Extension (Tehama, Glenn and Butte Counties), the Natural Resources Conservation Service (NRCS), the Point Reyes Bird Observatory (PRBO), private pest management companies, and local Prune Growers.

Technical Support

There are more than 20 other commodity based biological farming programs in California. The other commodities include almonds, citrus, grapes, walnuts, cotton, and tomatoes. The common thread of each of these programs is that the project is overseen by a management team with experience in biological farming systems and local farming conditions.

The management teams consist of farmers, pest control advisors (PCA), cover crop specialists, and University of California Cooperative Extension Farm Advisors. The management team provides the following technical support to participating farmers and their PCAs:

- On-site visits to develop and refine a customized farm management and monitoring plan.
- Field Days and skill improvement workshops to cover topics such as cover crop management, pest and beneficial insect identification, and habitat enhancement.
- Phone consultations and field visits to trouble shoot problems as they arise.
- On-site farm monitoring by field technicians to evaluate insect predators, earthworms, birds, mammals, and other indicators of biological activity.
- Monitoring reports summarizing data collected from all enrolled farms by participating PCAs and the BPS Team. The monitoring allows the growers to make informed management decisions and develop confidence in the BPS system.

The Management Team

Project Director: John Carlon, The Nature Conservancy
Project Coordinator: Fred Thomas, CERUS Consulting
Cooperative Extension: Bill Krueger, Glenn County
Rick Buchner, Tehama County
Bill Olson, Butte County
Local Farmers: David Evers, Farmland Management
Dick Jacobs, CSU, Chico Farm
Pest Control Advisor: Cliff Kitayama, Scientific Methods, Inc.

Cover Crop Planting Demonstration at Sol Norte Ranch Butte City. October 2, 9:00 to 11:30 AM. North of Bridge

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BPS Prunegram

November 1996 Vol. 1 no. 2

Growers Join BPS Program

Ten participating growers joined the BPS program placing 10 to 25 acre blocks of their prunes into new voluntary management options. The sites are located in Tehama (2), Glenn (3), Butte (2), Yuba (2), and Sutter (1) Counties. The different BPS blocks vary in size, soil types, age, and irrigation methods. Each ranch was visited by the Management Team after harvest and a custom management plan was developed for each site.

Depending upon the limitations of each site and the current pest control methods, the sites will try cover crops, filter strips and perennial grass roads, hedgerows of beneficial shrubs, compost applications, BT sprays, oil sprays, no sprays, and parasite releases. The BPS blocks were selected by the growers to be either entire orchards, a block that is divided in half for BPS and standard comparison, or even replicated design. Since each ranch is only trying several of these options, no two ranches are similar in their approach to management.

Similar Projects

In the past five years several original projects have served as the model for regional or commodity based biological farming programs. The original projects that used the regional approach were:

Randall Island Project
A pear program on Randall Island in the Delta that has 17 growers who use pheromone disruption to control Codling Moth and a soft chemical program.

Biologically Integrated Orchard Systems (BIOS)
An almond and walnut program located in seven counties that has over 80 nut growers who use cover crops, BT sprays, pheromone disruption, beneficial releases, raptor habitat and compost to improve the biodiversity and improve soil biota.

Lodi Woodbridge Wine Grape IPM Program
A wine grape program in San Joaquin county that encourages its members to experiment with improved monitoring, reduced methods of pest control, improved irrigation efficiency, cover crops and reduced mowing strategies.

From the success of these original projects that combine direction and support from researchers, extension specialists, growers, private consultants, and industry many other programs have been spawned. Some of the more prominent of these are:

Biologically Integrated Vineyard Systems (BIVS), Fresno County, Wine, Table, and Raisin Grapes.
Biologically Integrated Farming Systems (BIFS), Fresno County, Cotton, Tomatoes, and Vegetables.
Collaborative Processing Tomato Project, Yolo, Solano, Sacramento Counties. Tomatoes.
Sun Maid IPM Program. San Joaquin Valley. Raisins.
Temecula Grape Growers Association. Riverside and San Diego Counties. Wine Grapes.
Ventura Citrus Program, and a number of other locally directed commodity based programs for an integrated approach to pest management, crop culture, and biodiversity.

Upcoming BPS Meetings

January 10, Friday, 8:30 to 10:30 am, Richvale Cafe
"Aphids, Dormant Sprays, and Beneficial Habitat"

February 6, Thursday, 7:30 to 12:00 am, Colusa Farm Show
"BPS IPM Innovator Workshop"

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BPS IPM Innovator Workshop

Sponsored by the Biological Prune Systems Project
and
Cosponsored by the California Department of Pesticide Regulation, U. C. Cooperative Extension, The California Prune Board, the Natural Resources Conservation Service, and The Nature Conservancy

February 6, 1997
Colusa Farm and Equipment Show
Stagehands Theater

7:00 to 7:45 **Registration, Coffee, Donuts**

7:45 to 9:00 **Pest Management Concerns to the Prune Industry**

Introduction
Fred Thomas, CERUS Consulting, Project Coordinator
Dormant Spray Stewardship
David Supkoff, Department of Pesticide Regulation
'IPM Innovators'/Pest Management Grants
Bob Elliott, Department of Pesticide Regulation
The Biological Prune Systems Project
Fred Thomas, CERUS Consulting

9:00 to 9:30 **Break**

9:30 to 11:00 **Solutions for Prune Growers**

Why Leaf Aphids are the Concern of Prune Growers
Carolyn Pickel, UC IPM Area Specialist
Practicing the Best Management with Dormant Applications
Lori Twisselman, Ciba Crop Protection
Using Cover Crops to Prevent Dormant Spray Runoff
Lisa Ross, Department of Pesticide Regulation
Insectary Hedgerows: Movement of Beneficial Insects
Celia Lamb, Yolo County Resource Conservation District
Whats New in Beneficial Parasitoids
Carolyn Pickel, UC IPM Area Specialist

11:00 to 12:00 **Grower Panel 'Using IPM Practices'**

John Taylor; Taylor Bros. Farming, Organic Prune Grower
Marty Mariani; Mariani Nut Company, BIOS Walnut Grower
John Heier; John Taylor Fertilizers, BPS Project Grower

4 Hours PCA Credits

B iological
P RUNE
S ystems

Cover Crops Planting Demonstration

The Biological PRUNE Systems (BPS) is a cooperative program for Prune Growers to refine and adopt farming practices that remain economically viable while striving to protect environmental quality.

Date: October 2, 1996 **Time:** 9:00 to 11:30 AM
Place: Sol Norte Ranch, Butte City **Cost:** Free

Meeting Agenda

9:00 - 9:10	BPS Project Overview	Fred Thomas
9:10 - 9:25	Cover Crops and Seed Mixtures	Fred Thomas
9:25 - 9:40	Economics of Cover Crops	Rick Buchner
9:40 - 9:50	Seed Bed Preparation	Richard Attinger
9:50 - 10:00	Legume Inoculation	Bill Olson
10:00 - 11:10	Concurrent Demonstrations	
	1. Broadcast Seeding	Fred Thomas David Evers
	2. No Till Drill Planting	Dick Jacobs Bill Kellogg
11:10-11:30	How to Manage a Cover Crop	Bill Krueger

Refreshments courtesy of Lohse Mill, Inc.
Equipment provided by Sol Norte Ranch, Kellogg's Seed Service and Mid Valley Tractor

PCA Credits: 2.5 hrs.

Biological PRUNE System workshop Feb. 6 at show

Addressing the concern about the movement of dormant orchard applications the 1997 Colusa Farm and Equipment Show will be the site of the Biological PRUNE Systems (BPS) IPM Innovator Workshop. The Workshop will be Thursday morning, February 6, from 7:30 to 12 at the Stagehand's Theater. The meeting is sponsored by BPS, Department of Pesticide Regulation, The California Prune Board, U.C. Cooperative Extension, The Nature Conservancy, and the Natural Resources Conservation Service.

The presentations of the Workshop will feature the current concerns about application methods and off site movement of dormant sprays. The situation will be identified by agency and industry representatives, and solutions for prune growers and other orchardists will be presented. A panel of growers who use reduced application and IPM methods will offer their experience and techniques. There will be PCA credits available for the half day workshop and all Prune Growers, Orchardists, PCAs, PCOs, and interested agriculturalists are invited.

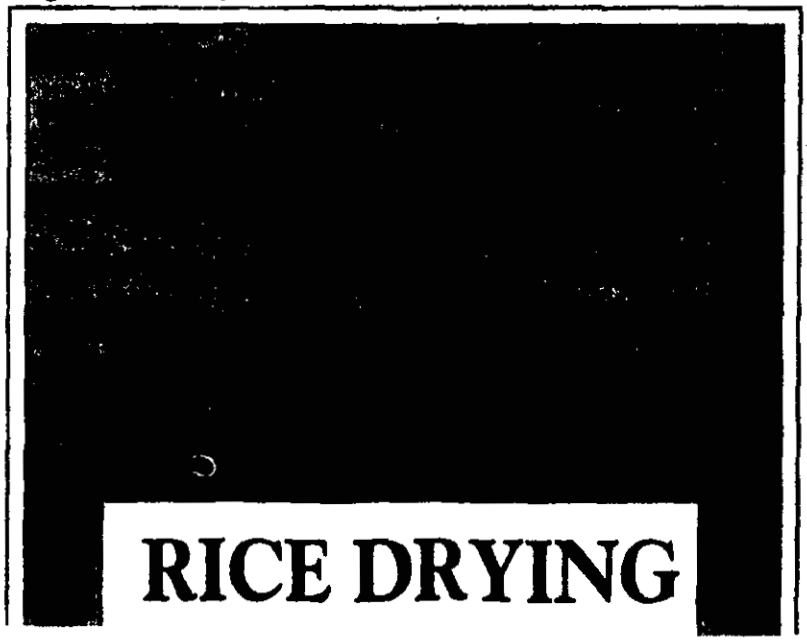
The BPS Demonstration Project was funded in 1996 by a grant from the IPM Innovator Program of the Department of Pesticide Regulations through The Nature Conservancy. The prune growers in the program and those who wish to join in 1997, voluntarily try different management methods on a 20 to 30 acre block with support from an advisory team. The program is defined by the advisory team as a cooperative program for Prune Growers to refine and adopt farming practices that remain economically viable while striving to protect environmental quality.

For more information on the Workshop at the Colusa Farm Show or the BPS program please contact Fred Thomas at CERUS Consulting, (916) 891-6958 or John Carlon at The Nature Conservancy, (916) 342-0396.

Drainage relief

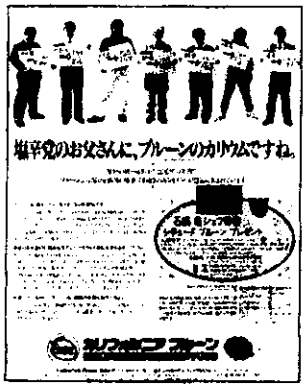
Supporting documents for a "Safe Harbor" program to shelter landowners who participate in a drainage relief pilot project are being prepared. Such a program would reduce the concern that land managed for drainage relief might become new habitat for endangered species.

With a "Safe Harbor" program in place, landowners who create habitat where none exists now would not be liable for incidental take of listed species. For further information, contact Earle Cummings at (916) 327-1656.



with her likeness and compelling message about incorporating California prunes into a healthy diet. CPB also exhibited at the CIBUS trade show in Milan, Italy.

In Germany, publicity focused on prunes as a healthy snack with national television coverage on the popular adventure program Ein Starkes Team and extensive sampling at business hotels and festivals in major German cities.



Japanese Potassium Advertisement

Advertising in Japanese lifestyle and cooking magazines communicated that California prunes are a good source of potassium which can help reduce high blood pressure caused by the traditional high sodium Japanese diet. In-store supermarket promotions and sampling demonstrations helped introduce Japanese consumers to California prunes at the point-of-sale. Prune samples were also distributed by large life insurance companies to their customers in an attempt to improve their diets and reduce their health risks. The Board again participated in cooking seminars for school lunch nutritionists in an attempt to increase the usage of California prunes in Japanese schools.

Activities in Mexico concentrated on trade education and in-store promotion and sampling activities using generic point-of-sale materials.

1995/96 BOARD INCOME & EXPENSES

INCOME:		
Carryover Funds	$	1,165,478
Carryover of Pension Fund Reserve	$	118,486
Production (Assessable tons only)		174,121
Assessment Rate per ton	$	50
Assessment Income	$	8,706,050
Misc. Income (Interest, etc.)	$	121,400
TOTAL INCOME	**$**	**10,111,414**
EXPENSES:		
Operating Expenses	$	169,748
Consulting Services	$	78,431
Crop Estimating Services	$	3,100
Production Research & Coordination	$	332,284
Public Relations	$	1,947,646
Advertising	$	3,731,617
Sales Promotion	$	914,784
International Market Development	$	1,069,021
Administration	$	329,459
TOTAL EXPENSES	**$**	**8,576,090**
Balance Carried Over	$	1,468,712
Pension Fund Reserve	$	66,612
TOTAL BALANCE CARRIED OVER	**$**	**1,535,324**

PRODUCTION RESEARCH

The Board funded 17 production research projects in 1995/96 as well as membership in the Minor Crop Farmer Alliance and California Commodity Committee at a total cost of $261,284. Donald Vossler served as Chairman of the Production Research Subcommittee, and Gary Obenauf, President of Agricultural Research Consulting, coordinated all research activities. For a report of these prune research projects, contact the Board office.

IPM INNOVATOR WORKSHOP

Biological PRUNE Systems

The 1997 Colusa Farm and Equipment Show will be the site of the Biological PRUNE Systems (BPS) IPM Innovator Workshop which will address the concern about the movement of dormant orchard applications. The Workshop will be held on Thursday morning, February 6, from 7:30 to 12:00 at the Stagehand's Theater. The meeting is sponsored by BPS, Department of Pesticide Regulation, the California Prune Board, U.C. Cooperative Extension, The Nature Conservancy, and the Natural Resources Conservation Service.

Presentations from agency and industry representatives will feature the current concerns about application methods and off-site movement of dormant sprays and solutions for prune growers and other orchardists. A panel of growers who use reduced application and IPM methods will offer their experience and techniques. PCA credits will be available for the half day workshop and all prune growers, orchardists, PCAs, PCOs, and interested agriculturalists are invited.

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For more information on the Workshop at The Colusa Farm Show or the BPS program please contact Fred Thomas at CERUS Consulting, (916) 891-6958 or John Carlon at The Nature Conservancy, (916) 342-0396.

California Prune News

is published by the California Prune Board (CPB) & the Prune Marketing Committee (PMC)

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Chairman, CPB

Earl Giacolini
Chairman, PMC

Richard Peterson
Executive Director
CPB & PMC

Bart Minor
Marketing Director, CPB

husband, Chuck, a seasoned performer, is one of those villains that makes you envy someone who can really enjoy being bad, really

Li'l Abner is being performed again this weekend, Saturday, August 3 at 7 p.m. and Sunday August 4 at 2 p.m.

Biological Prune system demonstration project

With a bumper crop of 1996 Prunes starting to go to the dehydrators, an innovative program is also starting to help prune growers adopt and refine farming practices that will enhance environmental quality while remaining economically sound.

Prune growers are being recruited in Butte, Glenn and Tehama counties for participation in this voluntary program. The BPS Prune program offers technical support and information exchange for growers interested in experimenting with a "whole systems" approach to farming.

Such an approach includes the integration of biological soil building and pest management systems, and may include the use of cover crops, compost, beneficial insects, vegetative filter strips, border plantings of shrubs and other optional practices that increase the prune orchard biodiversity.

Enrolled growers will benefit from on-site technical assistance, workshops and field days, assistance with monitoring of pest and beneficial insect populations, and the *BPS Prunegram*, a newsletter reporting on monitoring results, field practices, and associated research. New participants will have a customized farm plan for the BPS orchard developed in consultation with a Management Team.

The Management Team consists of farm managers Dick Jacobs and David Evers, University of California Cooperative Extension advisors, Bill Olsen, Bill Kruger, and Rick Buchner, independent Pest Control Advisor Cliff Kitayama, and cover crop specialist Fred Thomas. Also available to BPS growers are opportunities to participate in on-farm research and financial incentives.

This participatory program is funded by a grant from the Cal EPA's Department of Pesticide Regulations IPM Innovator Program through The Nature Conservancy. The program is a partnership of local Prune Growers, The Nature Conservancy, the U.S. Fish and Wildlife Service, California State University, Chico, University of California Cooperative Extension, the National Resources and Conservation Services, the Point Reyes Bird Observatory, and private farm supply and service industries.

The project's objectives within the guidelines of the IPM Innovator grant are to eliminate applications of the organophosphate Diazinon and reduce synthetic nitrogen applications by 30 percent over three years on the participating acreage.

To become a participating grower or to be put on the mailing list to receive the *BPS Prunegram* and meeting announcements, call the project coordinator, Fred Thomas of CERUS Consulting, at (916) 891-6958, or FAX (916) 891-5248.

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sessment rate increased four-fold to a high last year of $32, two of the original five pest control districts have withdrawn from the agency, and growers in two other districts are gathering signatures to force the boards of supervisors in Kern and Tulare counties to hold hearings on whether to dissolve their pest control groups as a way to escape from the agency's jurisdiction. In addition, two lawsuits are pending against the agency.

In the midst of the turmoil, state and federal groups have formed a coalition to combat tristeza statewide. The agency is part of the coalition, but Ted Batkin of the Citrus Research Board, another coalition member, said the coalition would continue if the agency is dissolved.

Batkin said the tristeza agency is im-

on the coalition's recommendation.

In addition to infestations in the San Joaquin Valley, the tristeza virus is present in Ventura County and other parts of Southern California, Batkin said. The virus is absent from southeastern Riverside County and the desert, although

The need for management strategies other than tree removal has meant "the coalition's first step was to get some research help in here," Batkin said. The scientist probably will work at the agency's laboratory in Tulare, he added.

close to call," Batkin said. To reach valid conclusions, the plan is to evaluate 20 groves annually for the next three years, he said. "We have one snapshot in one grove that showed enough information (to persuade us) that we've got to carry this program out to the end."

Prune growers sought for experimental program

The Biological Prune Systems program is searching Butte, Glenn, and Tehama counties for 12-15 growers interested in experimenting with a whole-systems approach to farming.

Patterned on the Biologically Integrated Orchard Systems program, BPS' whole-systems approach includes the integration of biological soil building and pest-management techniques, including the use of cover crops, compost, beneficial insects, vegetative filter strips and border plantings of shrubs.

"Initially, our goal is setting up a solid base to look at multiple options within all aspects of the prune-growing enterprise by getting farm advisors and growers involved," said Fred Thomas of CERUS Consulting. Thomas is the cover specialist with the BPS management team.

Other members of the program management team include farm managers Dick Jacobs and David Evers, University of California Cooperative Extension farm advisors Bill Olsen, Bill Krueger and Rick Buchner, and independent pest control advsor Cliff Kitayama.

Enrolled growers will benefit from on-site technical assistance, participate in workshops and field days, learn monitoring of pest and beneficial insect populations, and receive the BPS Prunegram newsletter.

The project is funded by a $30,000 grant from the state Department of Pesticide Regulations IPM Innovator Program through the Nature Conservancy. The project's objectives within the grant guidelines are to eliminate applications of the organophosphate Diazinon, and reduce nitrogen applications by 30 percent during three years on participating acreage.

"The best way to encourage growers to make these kinds of changes is to give them a little help along the way," said Thomas. "We'll be judging our progress by social changes in the growers regarding their ability to accept new techniques and changes in their farming practices."

For more information, growers should contact Thomas at (916) 891-6958, or by fax at (916) 891-5248.

Press Release

For More Information, Call: Fred Thomas, CERUS Consulting, 916-891-6958.

For Release Aug. 1, 1996

Biological PRUNE Systems (BPS) Demonstration Project Started in North Valley

(Start of Press Release)

With a bumper crop of 1996 Prunes starting to go to the dehydrators, an innovative program is also starting to help prune growers adopt and refine farming practices that will enhance environmental quality while remaining economically sound.

Prune growers are being recruited in Butte, Glenn, and Tehama Counties for participation in this voluntary program. The BPS Prune program offers technical support and information exchange for growers interested in experimenting with a "whole systems" approach to farming. Such an approach includes the integration of biological soil building and pest management systems, and may include the use of cover crops, compost, beneficial insects, vegetative filter strips, border plantings of shrubs and other optional practices that increase the prune orchard biodiversity.

Enrolled growers will benefit from on-site technical assistance, workshops and field days, assistance with monitoring of pest and beneficial insect populations, and the BPS Prunegram, a newsletter reporting on monitoring results, field practices, and associated research. New participants will have a

customized farm plan for their BPS orchard developed in consultation with a Management Team. The Management Team consists of farm managers Dick Jacobs and David Evers, University of California Cooperative Extension advisors, Bill Olsen, Bill Krueger, and Rick Buchner, independent Pest Control Advisor Cliff Kitayama, and cover crop specialist Fred Thomas. Also available to BPS growers are opportunities to participate in on-farm research and financial incentives.

This participatory program is funded by a grant from the Cal EPA's Department of Pesticide Regulations IPM Innovator Program through The Nature Conservancy. The program is a partnership of local Prune Growers, The Nature Conservancy, the U. S. Fish and Wildlife Service, California State University, Chico, University of California Cooperative Extension, the National Resources and Conservation Services, the Point Reyes Bird Observatory, and private farm supply and service industries. The project's objectives within the guidlines of the IPM Innovator grant are to eliminate applications of the organophosphate Diazinon and reduce synthetic nitrogen applications by 30 percent over three years on the participating acreage.

To become a participating grower or to be put on the mailing list to receive the BPS Prunegram and meeting announcements, please call the project coordinator, Fred Thomas of CERUS Consulting, at 916-891-6958 or FAX 916-891-5248.

(End of Press Release)

B iological
P RUNE
S ystems

California State University, Chico
Cover Crop Demonstration

Location: CSU, Chico Farm, Nicholaus C. Shouten Lane. East of Dairy Unit on main road.

Cooperators: Dick Jacobs, CSU Chico
Kim Cipriani, CERUS Consulting
Seed and Fertilizer Contributed by: Hedgerow Farms, Kamprath Seed, Lohse Mill, Pacific Coast Seed, Peaceful Valley Farm Supply, Resource Seed, and John Taylor Fertilizer, and U. of C. Nematology Dept.

Seed Bed: The 1 acre plot was bedded to 60 inch beds in August. The beds were pre-irrigated in September and volunteer weeds were controlled with 'Roundup' in early October.

Date Planted: October 20, 1996

Germinating Rain: October 24, 1996

Late Planting: Some plots will be planted during January to simulate a late planting. All Native grasses were started as plugs in the greenhouse and will be planted to weed free beds during January.

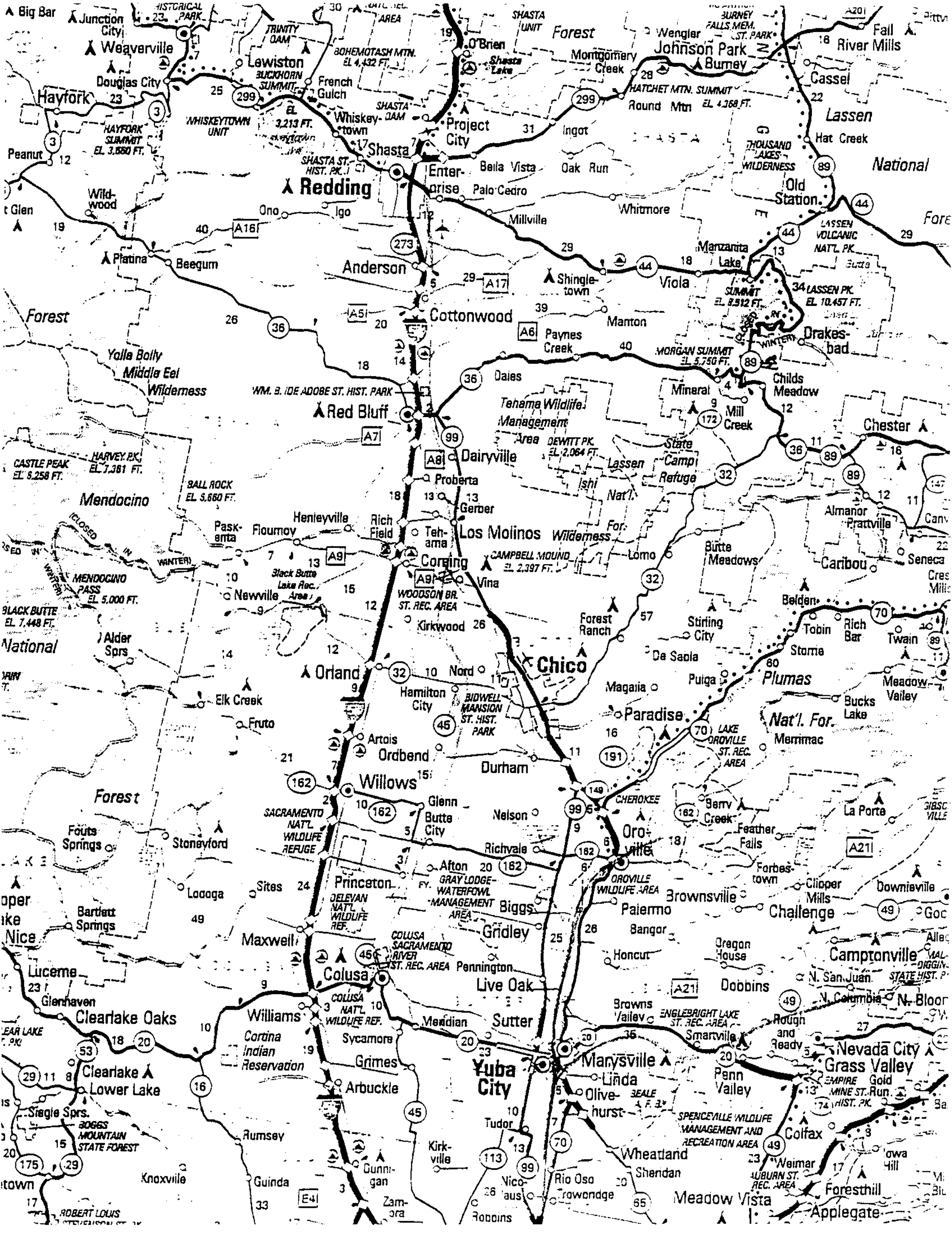
Fertilizer: 50 lb. 16-20-0

Inoculation: All seeds were either pre-inoculated with Rhizokote or inoculated with the appropriate strain of bacterium prior to planting, with the exception of Balansa Clover which was planted raw.

Soil Type & pH: Vina loam, pH 7.1.

Size of Plots: Plots are 4 feet wide and 50 feet long.
20 Plots per row
4 rows deep.

For more information contact Fred Thomas, CERUS Consulting, 916-891-6958, 916-891-5248 (FAX), ceruscon@aol.com


Big Bar
Junction City
Weaverville
Lewiston
Douglas City
Hayfork
French Gulch
Whiskeytown
Shasta
Redding
Project City
Enterprise
Bella Vista
Oak Run
Palo Cedro
Millville
Whitmore
O'Brien
Shasta Lake
Wengler
Montgomery Creek
Johnson Park
Burney
Fall River Mills
Cassel
Round Mtn
Ingot
Hat Creek
Lassen
National
Old Station
Peanut
Wildwood
Ono
Igo
Platina
Beegum
Anderson
Shingletown
Viola
Manzanita Lake
Cottonwood
Manton
Paynes Creek
Drakesbad
Dales
Mineral
Mill Creek
Childs Meadow
Chester
Red Bluff
Dairyville
Proberta
Gerber
Los Molinos
Tehama
Corning
Vina
Rich Field
Henleyville
Flournoy
Paskenta
Newville
Kirkwood
Forest Ranch
Chico
Orland
Nord
Hamilton City
Elk Creek
Fruto
Artois
Ordbend
Durham
Willows
Glenn
Butte City
Nelson
Richvale
Oroville
Stonyford
Fouts Springs
Lodoga
Sites
Princeton
Biggs
Gridley
Palermo
Maxwell
Colusa
Pennington
Live Oak
Williams
Meridian
Sutter
Yuba City
Marysville
Linda
Olivehurst
Grimes
Arbuckle
Sycamore
Tudor
Wheatland
Sheridan
Rumsey
Guinda
Knoxville
Kirkville
Nicolaus
Rio Oso
Zamora
Robbins
Clearlake Oaks
Clearlake
Lower Lake
Lucerne
Glenhaven
Nice
Bartlett Springs
Paradise
Magalia
De Sabla
Stirling City
Butte Meadows
Lomo
Caribou
Almanor
Prattville
Seneca
Belden
Tobin
Rich Bar
Twain
Storrie
Pulga
Plumas
Meadow Valley
Bucks Lake
Merrimac
Berry Creek
Feather Falls
Forbestown
Brownsville
Challenge
Clipper Mills
Downieville
La Porte
Bangor
Honcut
Oregon House
Camptonville
Dobbins
Browns Valley
Smartville
Rough and Ready
Nevada City
Grass Valley
Penn Valley
Colfax
Weimar
Foresthill
Meadow Vista
Applegate
Mendocino
Yolla Bolly Middle Eel Wilderness
Forest
Tehama Wildlife Management Area
Lassen Nat'l. For.
Ishi Wilderness
Sacramento Nat'l Wildlife Refuge
Gray Lodge Waterfowl Management Area
Cortina Indian Reservation
Boggs Mountain State Forest
Spenceville Wildlife Management and Recreation Area